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FISH SPECIES COMPOSITION/DIVERSITY OF THE WARRI RIVER, NIGER DELTA NIGERIA

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ABSTRACT

Changes in water quality caused by industrialization and technological advancement, affect fishery resources. The Warri River like many other water bodies in Niger Delta, Nigeria are experiencing side effects in terms of pollutant build up cum destruction of fishes resources.

This study investigated the fish species composition/diversity of the river in comparison to the base line studies of previous researchers. Nine sampling locations were chosen including, Jeddo, NNPC Jetty, Nigeria ports Authority Jetty, Main Warri market, Delta Steel Jetty, Shell Ramp, Udu Bridge/market Ugbolokposo and Agbarho.Fish species were collected from the respective nine Locations monthly for 24 months. Fish were obtained from landings of local fishermen every fortnight with prior arrangement. Highest diversity index of 3.48 occurred at shell Ramp/Globestar, while the least value of 2.63 was recorded at NNPC Jetty. The condition factor of most fish species in the study were above 1.0 though more species were better conditioned in location I (Jeddo). The cat fish families probably due to their hardy nature were best conditioned of all families represented. Thirty four fish species recorded in this study compared to 91 species obtained in previous works of 1989 -1994 reflects a sharp drop in species diversity.

Key words Fisheries Resources, Warri River, Species Diversity, Pollutants, Niger Delta.

INTRODUCTION

A comparison of the fish fauna of Warri River and some inland river such as Ase, Ogun and Niger/Benue show that these rivers have a greater variety of fish species. In these latter rivers more species are recorded in the rainy season when the rivers overflow their banks and annex hitherto separate water bodies with their fishes (Idodo-Umeh, 1987).In this regard, it seems justifiable to regard the fishes in the tributaries of Warri River around Warri as fishes, which migrated from the main channel for whatever reasons (Egborge, 1994). According to him the responses of aquatic organisms to increasing pollution varies.

There are at least 91 species of fish in 67 genera and 42 families in the Warri River system (Agada, 1986; Okumagba, 1987; Tetsola, 1988; Dibia, 1989; Oke-Anie 1989; Egborge (1994) state that the fisheries of the warri river have been diminished besides other negative effects of economic or socio-economic nature. According to him, the oral evidence of fishermen, suggests that apart from low catches, certain species of fish that were commonly seen in the Warri river before industrialization are now hardly seen. This study therefore attempts to determine fish species composition and diversity of the Warri river.

MATERIALS AND METHODS

Description of the Study Area : The study area was Warri River in Delta State, Nigeria. Warri River stretches within latitude $5°21^{1}$ – $6°00^{1}$N and longitude $5°24^{1}$ – $6°2^{1}$E. Its source is around Utagba Uno and runs in a Southwest direction passing between Oviorie and Ovu-inland and southwards at Odiete through Agbarho to Otokutu and Ugbolokposo (Egborge, 1994). It turns southward to Effurun and forms a 'W' between Effurun and Warri. Important land marks in this River stretch are Enerhen, Igbudu, Ovwian and Aladja (steel town). Warri Ports, main Warri market, NNPC Refinery, Globe star.

Fish Sampling:The study was conducted on two rainy seasons and two dry season months at 9 locations. Sampling was done monthly.Fish species were collected from the study area at each location monthly between the period of 24 months. Fish were caught at locations A(Jeddo), B(NNPC Jetty), C (NPA Jetty), D(main Warri Market), E (DSC Jetty), F(Shell Ramp/Globestar), G(Udu Bridge/Market), H(Ugbolokposo dredging site) and I(Agbarho), using gill nets of 1.5 inches (38.1mm) 2 inches (50.8mm), 3 inches (76.2mm) and 4 inches (101.6mm) stretched mesh size at dusk and retrieved at dawn. Baited hooks and lines as well as traditional basket traps, were also used in fishing. Fish were obtained from landing of local fishermen every fortnight with prior arrangement. The nets were sets in different locations in open water, flooded bush patches and shallow bays. Catches from long-lines, fish traps, and hollow cylinders made of bamboo and set hooks were used to obtain/ provide comprehensive picture of fish species in the Warri River.

Fish Enumeration:Catches were enumerated at the landing sites down to species level. Record of endemic fish species (fish regularly seen) was taken for each location. Records of distribution/population of fish assessed were collected at all the nine sampling locations.The fish species were identified to species level using the keys and descriptions of (Boulenger, 1916; Reed *et al*, 1967; Holden and Reed, 1972; Egborge, 1994, 2000, and 2001).The weights of the fish were measured to the nearest 0.1g using a meuler E-200 top loading balances and the standard lengths were measures to the accuracy of 0.1cm using a measuring board.Data processing involved the calculation

of diversity indices such as Margalef (Parsons *et al,* 1997), Shannon – Wiener (Shannon-weiver, 1963) and equitability (Lloyd and Ghelardi, 1964), Ogbeibu and Egborge, (1995) Margalef's values, is a measure of species richness.

RESULT AND DISCUSSION

Thirty-four fish species were identified during the study as shown in Table 1. Out of these, DSC Jetty and Shell Ramp/Globestar locations recorded the highest taxa (30) each comprising 4,503 (10.1%) and 4, 180 (10.3%) fishes respectively. Udu Bridge/market and Agbarho ranked next in terms of taxa, recording 29 each, while the numbers of fish caught were 4549 (11.2%) and 6,798 (16.7%) respectively. NPA Jetty recorded the least tax (22) with 3456 (8.5%) whereas NNPC Jetty had the least of them all in terms of individual (number of fish) caught 2905 accounting for just 7.2% of total catch.

Table 1:Species checklist ,abundance and distribution of fishes in Warri River

Family	Species	A	B	C	D	E	F	G	H	I	TOTAL
ANABANTIDAE	*Clenopoma kingsleyae*	51	21	37	38	31	31	28	46	75	358
ARIDAE	*Arius gigas*	112	60	93	96	85	108	119	161	203	1037
BAGRIDAE	*Auchenoglanis occidentalis*	462	360	418	307	323	128	166	221	187	2572
	Chrysichthys longifilis	238	268	246	228	283	160	256	287	286	2252
	Chrysichthys nigrodigitatus	386	355	376	380	414	307	250	343	411	3222
	Chrysichthys furciatus	288	293	282	305	284	219	236	349	402	2658
	Chrysichthyswalkeri	260	206	280	290	206	209	155	215	244	2065
CARANGIDAE	*Caranx hippos*	0	0	0	0	32	47	64	94	113	350
	Caranx senegalus	0	0	0	0	0	83	92	108	133	396
	Caranx langubris	0	0	0	0	57	73	67	73	126	396
	Chloroscombu chrysuris	0	0	0	0	85	42	47	73	85	332
CHANNIDAE	*Parachana obscura*	342	0	0	0	0	0	476	654	741	2213
CICHLIDAE	*Oreochromis niloticus*	218	0	0	0	0	186	151	180	281	1016
	Chromodotilapia guentheri	85	0	0	61	201	284	230	0	272	1048
	Hemichromis bimaculatus	62	0	0	0	32	115	237	237	241	924
	Hemichromis fasciatus	111	4	0	4	83	74	67	105	110	558
	Tilapia zilli	336	21	0	0	110	102	104	212	373	1258
CITHARINIDAE	*Citharinus citharus*	223	155	122	170	202	199	174	237	404	1886
CLARIIDAE	*Clarias lazera*	277	181	182	200	204	144	184	294	385	2051
CLUPEIDAE	*Ethmalosa fimbriata*	444	209	205	274	396	263	330	403	316	2840
	Ilisha africana	240	40	285	234	207	237	210	129	69	1651
	Sardinella maderensis	211	79	212	196	234	256	175	97	60	1520
	Pellonula afzeliusi	165	104	155	189	191	177	32	33	36	1082
CYNOGLOSSIDAE	*Cynoglosus browni*	82	94	107	100	108	110	0	0	0	601
CYRINIDAE	*Labio coubie*	0	0	0	0	61	71	118	185	230	665
	Labio senegalensis	0	0	60	57	40	92	96	78	120	543
DISTICHODONTIDAE	*Distichodus brevipinnis*	137	83	108	81	85	0	0	0	0	494
	Distichodus rostratus	90	74	88	70	56	47	0	0	0	425
	Distichodus engycephalus	94	61	93	50	63	74	0	0	0	435
GOBIDAE	*Corconogobis schlegelli*	92	88	44	74	34	7	71	87	94	591
GYMNARCHIDAE	*Gymnachus niloticus*	20	0	0	0	0	0	30	64	78	172
MALAPTERIDAE	*Malapterurus electricus*	221	111	0	0	177	203	241	312	447	1712
MONODACTYLIDAE	*Psettias sebae*	67	38	63	46	67	0	0	0	0	281
NOPTOTERIDAE	*Xenonystus nigri*	0	0	0	11	152	112	143	203	276	897
TOTAL		5314	2905	3456	3461	4503	4180	4549	5480	6798	

The families and species found in DSC Jetty, Shell Ramp/Globestar, Udu Bridge/Market, Ugbolokposo dredging site and Agbarho, but absent in NNPC Jetty, NPA Jetty and main Warri market were, CARANGIDAE (*Caranx hippos*; *C langubris*, and *Chloroscombus chrysurus*), CHANNIDAE (*Parachana obscura*)and CICHLIDAE (*Oreochromis niloticus, Chromodotilapia guentheri, Hemicromis biinaculatus, Hemicromis faciatus* and *Tilapia Zillii*). On the other hand, some of the species not found in Udu Bridge/market, Ugbolokposo, Shell Ramp/Globestar and Agbarho, yet commonly seen at DSC, main Warri market, NPA, NNPC include (CYNOGLOSSIDAE (Cynoglossus browni), DISTICHODONTIDAE (*Distichodus brevipinnis, D rostratus, D engycephalus*) and *MONODACTYLIDAE (Psettias sebae)*.The families BAGRIDAE (e.g *Auchenoglanis Occidentalis* and CICHLIDAE dominated the collections in terms of number of taxa, although Bagridae dominated relative to abundance 12,769 (31%), followed by CLUPEIDAE (e.g *Ilisha africana*) 7,093 (17.5%) and CICHLIDAE 4804 (11.8%). Agbarho recorded 18 dominant species (relatively highest number of individuals caught), while Jeddo, DSC Jetty, Shell Ramp/Globestar and NPA Jetty were dominant in 7,4,3, and 1 species caught respectively among the 9 locations of the study (Table 1). The NNPC Jetty, Main Warri Market and Udu Bridge/Market never dominated in any of the species caught during the study. Ugbolokposo dredging site produced 12 subdominant species while Jeddo and NPA Jetty obtained 6 and 4 subdominant species caught respectively.

Species Diversity of the Warri River

The responses of aquatic organisms to increasing pollution varies (Egborge 1994). Changes in water quality caused by industrialization and technological development, are known to affect fish and other benthic communities (Patil, 1976; Obeng, 1981; Ogbeibu and Ezeunara, 2002). The overall number of species (34) recorded in all the 9 study locations during this study is low when compared with 91 species earlier reported by Agada (1986); Okumagba (1987); Tetsola (1988); Dibia (1989); Okia-Anie, (1989). The species number were also lower than (58 species) documented for flood plain rivers in Africa by Welcome (1979). The reduction in the number of fish species and what appeared to be a local extinction of some fish families in the down stream location; could be attributed to effect of impoundment – a the statement earlier made by Victor and Tetteh (1988) and Margalef (1961).Location B (NNPC Jetty) segment of the river recorded the lowest species diversity in all cases (Table 2). *Auchenoglaris occidentalis* and *Corconogobius schlegeli* earlier recorded as by Egborge as rare species in the main channel of the river were commonly caught there, indicating temporary nature of community changes result from habitat alternation. Fish species that are unable to withstand environmental condition may die or migrate to elsewhere, while those that are hardy enough, survives.

Table 2:Spatial Variation in Fish Diversity Index of Fish Species of Warri River

Sampling Locations	A	B	C	D	E	F	G	H	I
No of species	27	22	20	23	30	30	29	28	29
Total captured	5314	2905	3456	3461	4503	4180	4549	5480	6789
Margalef's index	3.0310	2.6335	2.3315	2.6996	3.4473	3.4780	3.3246	3.1363	3.1735
Shannon Weiner's index	4.4760	4.0172	4.1718	4.1252	4.5490	4.6493	4.5791	4.5043	4.5556
Simpson's index	0.9491	0.9301	0.9306	0.9343	0.9496	0.9501	0.9519	0.9301	0.9508
Pielou's Eveness index	0.9413	0.9007	0.9652	0.9118	0.9270	0.9474	0.9425	0.9369	0.9377

CONCLUSION

The culmination of many industrial/domestic activities, had lead to increased turbidity and heavy metal toxicity which had attained lethal proportions (especially in Ni, Pb and Cd) beyond that which can protect health of fish and biological diversity (Aghoghovwia, 2008). This according to him accounts for the sharp drop of fish species (from 94 species) in base line studies to the 34 species obtained in the present study. The 34 fish species caught compared to 91 species reported by other workers, reflects a sharp drop in species diversity. To avoid further deterioration of water quality and aquatic resources of the Warri River, it is expedient to place the river under surveillance in view of the local community (especially the poor) who depend on the river for food fish and water.

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